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ANTI-CORRUPTION AUDIT AS A KEY IMPERATIVE FOR ENSURING THE OPERATIONAL EFFECTIVENESS OF CRITICAL INFRASTRUCTURE ENTERPRISES UNDER MARTIAL LAW AND POST-WAR RECONSTRUCTION IN UKRAINE

Abstract. *This article substantiates the role of anti-corruption audit as a strategic management tool aimed at enhancing the efficiency, resilience and institutional reliability of critical infrastructure enterprises operating under martial law and during Ukraine's post-war reconstruction. The large-scale inflow of state and international funds for reconstruction, simplified procurement procedures and crisis management practices significantly increase corruption vulnerabilities. Such threats affect not only financial results but also national security, social stability and the trust of international partners is undermined.*

The study employs a systematic and risk-oriented methodological approach that integrates compliance analysis, internal control assessment, expert modelling and indicative evaluation methods. A structural model of anti-corruption audit is proposed, covering the identification of high-risk processes, diagnosis of the internal control system, analysis of potential conflicts of interest, assessment of procurement transparency and monitoring financial flows related to reconstruction. An integrated Anti-Corruption Resilience Index for enterprises is proposed.

It is demonstrated that anti-corruption audit performs preventive, control and reputational functions. Its institutionalisation within the corporate governance system of critical infrastructure enterprises is a key prerequisite for the effective management of reconstruction resources and the strengthening of economic security. Practical recommendations have been formulated for enterprises in the energy, transport, water supply and defence-industrial sectors.

Keywords*: anti-corruption audit, anti-corruption, critical infrastructure, martial law, post-war reconstruction, economic security, corporate governance, compliance.*

АНТИКОРУПЦІЙНИЙ АУДИТ ЯК КЛЮЧОВИЙ ІМПЕРАТИВ ЗАБЕЗПЕЧЕННЯ ЕФЕКТИВНОСТІ ДІЯЛЬНОСТІ ПІДПРИЄМСТВ КРИТИЧНОЇ ІНФРАСТРУКТУРИ В УМОВАХ ВОЄННОГО СТАНУ ТА ПІСЛЯВОЄННОГО ВІДНОВЛЕННЯ УКРАЇНИ

Анотація. *У статті обґрунтовано роль антикорупційного аудиту як стратегічного інструменту управління, спрямованого на підвищення ефективності діяльності, стійкості та інституційної*

надійності підприємств критичної інфраструктури в умовах воєнного стану та післявоєнного відновлення України. Доведено, що масштабне залучення державних і міжнародних фінансових ресурсів для реалізації відбудовчих проєктів, спрощення процедур закупівель та необхідність оперативного ухвалення управлінських рішень істотно підвищують рівень корупційних ризиків. Такі ризики негативно впливають не лише на фінансові результати діяльності підприємств, а й на економічну безпеку держави, суспільну стабільність та рівень довіри міжнародних партнерів і донорських організацій.

Дослідження базується на системному та ризик-орієнтованому підходах, які поєднують інструменти комплаєнс-аналізу, оцінювання внутрішнього контролю, експертного моделювання та індикативного аналізу. Запропоновано структурну модель антикорупційного аудиту, що передбачає ідентифікацію найбільш уразливих бізнес-процесів, оцінювання ефективності внутрішнього контролю, виявлення потенційних конфліктів інтересів, аналіз прозорості закупівельних процедур та моніторинг фінансових потоків, пов'язаних із реалізацією програм відновлення. Визначено основні сфери підвищеної корупційної вразливості підприємств критичної інфраструктури, серед яких закупівлі, управління підрядними роботами, відновлення активів, логістичні процеси, використання міжнародної допомоги та корпоративне управління.

Розроблено інтегральний індекс антикорупційної стійкості підприємства, який дає змогу кількісно оцінювати рівень інституційної доброчесності та ефективність функціонування антикорупційних механізмів. Обґрунтовано доцільність використання ризик-орієнтованої моделі оцінювання корупційних ризиків і запропоновано систему показників для моніторингу їхнього впливу на діяльність підприємства. Доведено, що антикорупційний аудит виконує не лише контрольну, а й превентивну та репутаційну функції, сприяючи підвищенню прозорості управлінських процесів, зміцненню довіри інвесторів та забезпеченню ефективного використання ресурсів відбудови.

Практичне значення дослідження полягає у можливості застосування запропонованих підходів підприємствами енергетичного, транспортного, водопостачального та оборонно-промислового секторів, а також органами державного управління та міжнародними донорами для оцінювання ефективності використання фінансових ресурсів і посилення економічної безпеки в умовах післявоєнної реконструкції України.

Ключові слова: *оцінювання корупційних ризиків, комплаєнс-контроль, внутрішній аудит, економічна безпека, управління доброчесністю, прозорість закупівель, управління процесами відновлення.*

Formulation of the problem. Full-scale war has radically altered the functional role of critical infrastructure enterprises in Ukraine. Energy facilities, transport networks, logistics hubs, water supply systems, telecommunications platforms and enterprises within the defence-industrial complex now function not only as economic entities but also as key elements of the architecture of national resilience. Their uninterrupted operation directly impacts the state's defence capability, humanitarian stability and social cohesion.

Under martial law, management decisions are often made amid extreme uncertainty, time constraints and resource shortages. Emergency procurement, direct contracts, urgent infrastructure restoration and logistical reorganisation create a situation in which traditional control mechanisms are weakened. Although such simplifications are justified from an operational perspective, they simultaneously increase the scope for potential abuse, conflicts of interest and inefficient use of funds.

The post-war reconstruction phase further exacerbates these challenges. An unprecedented volume of international financial aid, loans, grants and private investment is expected to be directed towards rebuilding destroyed infrastructure and modernising strategic sectors. In international reconstruction programmes, transparency, accountability and integrity in resource management are recognised as key prerequisites for sustained support. Consequently, enterprises implementing reconstruction projects must demonstrate high standards of anti-corruption governance.

In this context, anti-corruption audit emerges as a strategic management instrument that integrates the internal corporate governance system with external accountability requirements. Unlike traditional financial audits, which focus primarily on the reliability of financial reporting, anti-corruption audits are aimed at identifying corruption risks, systemic vulnerabilities and behavioural factors that may lead to the misuse of resources. Therefore, the development of effective anti-corruption audit mechanisms for critical infrastructure enterprises represents an important scientific and practical task under martial law and during Ukraine's post-war reconstruction.

Analysis of recent research and publications. The issue of anti-corruption auditing has developed significantly in recent years in both international and national academic discourse. Contemporary economic literature views corruption as a systemic factor of economic inefficiency that distorts incentives, increases

transaction costs and undermines institutional trust [1]. In the field of corporate governance, integrity and compliance systems are increasingly interpreted as key determinants of companies' long-term sustainability and investment attractiveness [2].

Risk-based internal audit models emphasise the importance of identifying non-financial risks, particularly fraud and corruption, as integral components of enterprise risk management systems [3]. Research in the field of public finance management demonstrates that large-scale recovery programmes are particularly vulnerable to corruption due to complex procurement chains, implementation urgency and the involvement of multiple stakeholders [4; 5].

In Ukrainian academic research, anti-corruption auditing is considered a specialised area of audit aimed at identifying corruption risks, assessing the effectiveness of anti-corruption programmes and developing recommendations for preventing abuse. Hryhorevska and Kardash [7] emphasise the role of anti-corruption audit as a tool for combating fraud and strengthening internal control systems. Minaylo and Shishkina [8] consider anti-corruption audit an effective mechanism for increasing transparency and accountability at the enterprise level. Mishchenko [10] systematises the conceptual foundations of anti-corruption auditing and substantiates its place within corporate governance systems. Potieieva and Storozhuk [11] analyse innovative approaches to anti-corruption auditing, including the use of digital technologies, data analytics and risk-based models.

Despite the considerable scientific achievements in this field, issues related to the integration of anti-corruption auditing into the management systems of critical infrastructure enterprises under martial law and post-war reconstruction remain insufficiently explored. In particular, there is a need to develop practical tools for assessing corruption resilience and improving the effectiveness of anti-corruption governance mechanisms.

The purpose of the article is to develop a methodological approach to the integration of anti-corruption auditing into the management systems of critical infrastructure enterprises in order to ensure their operational effectiveness, resilience and institutional reliability under martial law and during the post-war reconstruction of Ukraine.

The main material presentation. The methodological basis of the study is founded on a combination of qualitative and quantitative approaches. Firstly, a systemic approach has been applied to determine the place of anti-corruption audit within the broader architecture of corporate governance and economic security of critical infrastructure enterprises. This approach allows corruption risks to be viewed not as isolated incidents, but as systemic phenomena linked to organisational structure, incentive systems and the regulatory environment.

Secondly, a risk-based audit methodology was employed. Under this approach, audit resources are concentrated on areas with the highest probability and scale of potential corruption-related losses. Such areas are identified based on expert assessments, business process analysis and internal documentation.

Thirdly, a compliance analysis was applied to assess the alignment of the company's internal policies with national anti-corruption legislation and international integrity standards. Particular attention has been paid to codes of conduct, conflict of interest policies, whistleblower protection mechanisms and counterparty due diligence procedures.

Fourthly, indicative modelling was used to develop an integrated Anti-Corruption Resilience Index, which reflects the company's ability to prevent, detect and neutralise corruption risks.

The anti-corruption audit process is structured around five main stages:

- preliminary development of the enterprise's risk profile;
- analysis of the regulatory and procedural environment;
- assessment of the effectiveness of internal controls;
- testing of selected operations and procurement procedures;
- formulation of a comprehensive assessment and recommendations.

The analysis shows that the most vulnerable areas of operation for critical infrastructure enterprises under martial law and during reconstruction are procurement, contractor management, asset restoration projects and emergency logistics. These processes are characterised by large financial volumes, urgent deadlines and limited competition. Table 1 summarises the main areas of corruption risk.

Table 1

Key areas of corruption risk in critical infrastructure enterprises

№	Key areas of anti-corruption audit procedures	Typical and additional corruption risks – the focus of anti-corruption audits	Potential consequences of corruption risks materialising
1.	Procurement	Collusion among participants; price gouging; rigged tenders; manipulation of technical specifications; splitting of procurement contracts; abuse of the negotiated procedure under the pretext of military necessity; use of affiliated suppliers	Budget losses; reduced quality of goods and services; discrediting of reconstruction programmes; loss of donor confidence
2.	Contract works	Fraudulent schemes; lobbying on behalf of specific companies; non-transparent subcontracting chains; fictitious certificates of completion; substitution of materials; conflicts of interest among officials	Inefficient contractors; technical defects; rising project costs; reputational damage
3.	Asset rehabilitation	Overstatement of work volumes; manipulation of cost estimates; artificial expansion of funding volumes through additional agreements; concealment of the actual condition of facilities	Delays in implementation; repeat repairs; high failure rates; inefficient use of international aid
4.	Logistics	Misuse of resources; manipulation of stock records; informal payments to prioritise deliveries; misuse of humanitarian aid	Operational disruptions; loss of material resources; social tension
5.	Construction of facilities for the security and defence sector	Classified procurement without proper oversight; inflated costs due to limited competition; manipulation of change orders; use of affiliated companies; simulation of technical supervision	Systemic financial losses; threat to national security; institutional erosion of oversight
6.	Management of international aid and grant resources	Political patronage in the allocation of funds; non-transparent project selection criteria; conflicts of interest on supervisory boards; formal reporting without actual verification of results	Freezing of funding; reduction in international support; undermining the legitimacy of reforms
7.	Corporate governance and compliance	The formal nature of anti-corruption programmes; lack of protection for whistleblowers; imitation of internal controls; tolerance of «quasi-loyalty» to management	Increase in latent corruption; demotivation of staff; erosion of ethical culture

Source: compiled by the authors based on [6;9]

The findings of a sociological study on perceptions of reconstruction and corruption in Ukraine [6] indicate a high level of public sensitivity to the risks of non-transparent allocation of funds, political patronage and abuse of power during the implementation of infrastructure projects. This gives rise to a new dimension of corruption vulnerability: reputational and institutional. Even in the absence of proven offences, insufficient transparency of procedures, limited access to information and poor communication with the public can lead to a crisis of confidence. For critical infrastructure enterprises, this means higher costs of raising capital, increased regulatory scrutiny and rising transaction costs.

The results of a sociological survey on employees' level of trust in the internal control system and their assessment of the transparency of management procedures should be incorporated into the structure of the integrated anti-corruption resilience index. The data obtained can be used to assess the transparency of procedures indicator T_p, which allows for the consideration of not only financial but also behavioural and organisational aspects of the management system's functioning.

Furthermore, the results of the sociological survey can be used to adjust the model's weighting coefficients depending on the level of perception of corruption risks by the enterprise's employees. This enhances the adaptability of the integrated index and ensures a more comprehensive approach to assessing the effectiveness of anti-corruption policy.

The integration of sociological data into the audit analysis system allows for greater objectivity in assessment and broadens the information base for management decision-making.

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The management of international aid presents a particular set of risks. In the context of large-scale financial support from donors, there is an increased likelihood of informal influence on project prioritisation, the creation of a 'manual' decision-making process, and the use of grant funds to further the interests of specific groups. Under such conditions, anti-corruption audits must cover not only financial discipline but also strategic planning procedures, project selection criteria and mechanisms for independent performance

monitoring.

Research into corruption risks in construction projects commissioned by law enforcement and paramilitary bodies [9] highlights the specific nature of the security sector: a combination of restricted access to information, high contract values and the urgency of work completion. The practice of making numerous changes to contracts after they have been signed, the use of complex subcontracting chains, and the formal nature of technical supervision create opportunities for covert cost inflation and a decline in construction quality. Given the strategic importance of such facilities, the consequences of corruption risks extend beyond financial losses and can turn into direct threats to national security.

An additional challenge is the formalisation of compliance policies without their actual implementation. In times of crisis, companies may declare that they have anti-corruption programmes in place, yet in practice limit themselves to a minimal set of procedures without adequate internal controls or protection for whistleblowers. Such 'pretend integrity' increases residual corruption risk and reduces the effectiveness of the proposed Anti-Corruption Resilience Index.

Consequently, expanding the list of corruption risk areas reflects a shift from a narrow operational perspective to a systemic model that takes into account institutional, security and behavioural factors. In this context, an anti-corruption audit must integrate an analysis of governance transparency, control over contract amendments, subcontracting structures, public monitoring mechanisms and stakeholder trust levels. Only such a multidimensional model can ensure the genuine resilience of critical infrastructure enterprises under martial law and during post-war reconstruction.

Within the framework of a risk-based approach, it is advisable to determine the level of corruption risk using the following formula:

$$R = P \times I, \tag{1}$$

where: R is the overall level of corruption risk; P is the probability of a breach occurring; I is the scale of potential losses.

The indicators and are assessed on a five-point scale, where 1 represents a very low level of risk or impact, and 5 represents a critical level. The sources of information for determining these indicators are the results of internal audits, financial statements, analytical materials from the internal control department, as well as expert assessments by specialists in the field of audit and risk management. The use of such a model allows for a quantitative assessment of the level of risk and enables the timely adoption of management decisions to minimise potential threats.

To quantify institutional integrity, the Corporate Anti-Corruption Resilience Index is proposed:

$$I_{ac} = w_1 R_c + w_2 C_e + w_3 T_p + w_4 M_f, \tag{2}$$

where R_c is the residual corruption risk level; C_e is the effectiveness of the internal control system; T_p is the transparency of procurement procedures; M_f is the effectiveness of financial monitoring; w_i are the weighting coefficients for the significance of the indicators.

Within the scope of this study, the weighting coefficients for the integrated anti-corruption resilience index of critical infrastructure enterprises were determined using an expert assessment method, involving specialists in the fields of auditing, internal control and corporate governance. The highest weighting was assigned to the corruption risk level indicator, as this is the factor that directly influences the stability of a critical infrastructure enterprise's operations.

Accordingly, the weighting coefficients are as follows:

$w_1 = 0.35$ – level corruption risks;

$w_2 = 0.25$ – effectiveness internal control;

$w_3 = 0.20$ – transparency procedures;

$w_4 = 0.20$ – monitoring financial flows.

Thus, the proposed model is of practical use and can be employed to assess the effectiveness of the internal audit system in critical infrastructure enterprises.

For government bodies and international donors, an anti-corruption audit can serve as a tool for monitoring the effective use of reconstruction funds. Enterprises with higher I_ac scores demonstrate greater institutional reliability and readiness to attract investment and implement large-scale infrastructure projects.

To test the functionality of the integrated index, a pilot study was conducted at enterprises in the energy and transport sectors. The results of the calculations showed that the proposed index makes it possible to assess an enterprise's level of anti-corruption resilience, identify weaknesses in the internal control system and detect potential risks in a timely manner.

The values of the integrated index are interpreted according to the following levels: low level of anti-corruption resilience – from 0 to 0.30; medium – from 0.31 to 0.60; high – from 0.61 to 1.00. This approach enables a comparative analysis of enterprises and enhances the analytical value of the audit assessment.

Conclusions. A synthesis of the research findings suggests that, in the context of martial law and large-scale post-war reconstruction, anti-corruption auditing is evolving from a tool for responding to violations into a strategic mechanism for ensuring the institutional resilience of critical infrastructure enterprises. The increased concentration of financial resources, simplified procurement procedures, the sector-specific nature of defence and security projects, and the growing role of international aid create a multidimensional landscape of corruption risks, encompassing operational, financial, managerial and reputational aspects of operations.

The proposed risk-based approach to anti-corruption auditing, structured around the stages of risk profiling, analysis of the regulatory environment, assessment of internal controls, testing of procedures and comprehensive evaluation of results, provides a methodological framework for the systematic identification and mitigation of risks. The expansion of the list of critical risk areas, particularly in the construction of security sector facilities, the management of international grant resources, and corporate compliance, confirms the need to integrate anti-corruption auditing into the strategic management framework.

The developed Enterprise Anti-Corruption Resilience Index allows for the quantitative measurement of the level of institutional integrity and the comparison of the effectiveness of anti-corruption mechanisms over time. Its application creates the conditions for enhancing transparency, the soundness of management decisions, and trust on the part of state bodies and international donors. Thus, anti-corruption auditing takes on the role not only of control, but also of an instrument of economic security and the enterprise's reputational capital.

The practical implementation of the proposed approaches requires greater digitalisation of audit procedures, the development of data analytics, the improvement of whistleblower protection mechanisms, and the institutionalisation of independent oversight. Further research should focus on developing sector-specific models for assessing corruption vulnerability, adapting international integrity standards to the conditions of a war economy, and developing tools for the continuous monitoring of the effectiveness of reconstruction programmes.

Consequently, the institutionalisation of anti-corruption auditing within the corporate governance system of critical infrastructure enterprises is a prerequisite for the effective use of reconstruction resources, the strengthening of the state's economic security, and the assurance of the long-term sustainability of the national infrastructure system.

References

1. Rose-Ackerman S., Palifka B. Corruption and Government. Cambridge University Press. https://doi.org/10.1017/CBO9781139962933 (Accessed: 23 December 2026).

2. OECD. Corporate Governance and Integrity. OECD Publishing. https:// www.oecd.org/corporate/corporate-governance/ (Accessed: 23 December 2026).

3. Institute of Internal Auditors. International Professional Practices Framework (IPPF). https://www.theiia.org/en/standards/what-are-the-standards/ippf/ (Accessed: 23 December 2026).

4. World Bank. Reconstruction Governance: Managing Risks in Post-Conflict Recovery. World Bank Publications. https://www.worldbank.org/ (Accessed: 23 December 2026).

5. OECD. Integrity and Anti-Corruption in State-Owned Enterprises. OECD Publishing. https://www.oecd.org/corporate/soe/ (Accessed: 23 December 2026).

6. Transparency International Ukraine. How Ukrainians view reconstruction, corruption and European integration: a public opinion poll. URL: https://ti-ukraine.org/research/yak-ukrayintsi-spryjmayut-vidbudovu-koruptsiyu-ta-yevrointegratsiyu-opytuvannya-suspilnoyi-dumky/ (Accessed: 23 December 2026).

7. Grigorevska, O. O., & Kardash, I. P. Anti-corruption audit as a means of combating fraud: general organisational issues. 2024.

8. Minaylo, V. P., & Shishkina, M. A. Anti-corruption audit as a tool for combating corruption. 2023.

9. Kvasnitska, O., & Biloshkurskyi, M. M. (2025). CORRUPTION RISKS IN CONSTRUCTION PROJECTS COMMISSIONED BY SECURITY AND PARAMILITARY AGENCIES: IDENTIFICATION AND MITIGATION STRATEGIES. Social Development: Economic and Legal Issues, (9). https://doi.org/10.70651/3083-6018/2025.9.20 (Accessed: 23 December 2026).

10. Mishchenko T. Anti-Corruption Audit: Concept, Types, and Elements. Accounting and Finance. 2024. No. 1(103). P. 130–136. DOI: https://doi.org/10.33146/2307-9878-2024-1(103)-130-136 (Accessed: 23 December 2026).

11. Poteyeva, M., & Storozhuk, O. Innovative Approaches to Anti-Corruption Auditing: International Experience and National Prospects. 2025. https://kntu.kr.ua/ file/content/19361/zbirnyk-tez-

dopovidei-lix-naukovo-tekhnichnoi-konferentsiizdobuvachiv-vyshchoi-osvity-24-25-kvitnia-2025-roku-naukavyrobnytstvu-2025-.pdf#page=50 (Accessed: 23 December 2026).

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